EPIDEMICS.

The limitation of epidemic pestilential diseases, as the yellow fever, typhus and typhoid, diphtheria, etc., is at all times a question of intense interest to every thoughtful person. The July number of the New York *Sanitarian* contains interesting and valuable matter upon the subject of epidemics, which we unhesitatingly appropriate:

The cholera is a product of the jungles of India and Burmah, and the yellow fever is as surely of West Indian origin. That it is an exotic as relates to the United States is the opinion of the last national commission; and that it never originates *de novo*, except in its primal birth-place, whatever elsewhere may be the excess of heat moisture, filth, and vegetable and animal decomposition, is almost demonstrated, perhaps established. As to communicability, it is certainly conveyed from individual to individual, not precisely by what we understand to be direct contagion, but through various media, especially by bed and body clothing, by articles of furniture, by apartments, cars and steam and sailing vessels, by baggage and by cargoes; and these propagators, deriving from the sick the pestilential material (intentionally not called germ), hold it with wonderful tenacity, and convey it to mankind with intense effect. Both may be held at bay by quarantine and literally "fenced out." In 1851 cholera prevailed in Southern Europe and in Algeria, but not one case occurred that year in Spain by reason of vigorous quarantine. Two years later, when the embargo was not strictly maintained, it ravaged the Spanish peninsula. It always followed the lines of travel and was always carried by mankind. The infectious germ might be long in germinating, but it could always be traced to individuals. Quarantine, to be effectual, however, must have a very wide applicability. It will not suffice to limit it to vessels from foreign ports. It must extend to all conveyances for the transportation of passengers and merchandise—must have relations with municipal, State and national authority. It is estimated that the cost of the late yellow fever epidemic in loss amounted to $200,000,000.

Typhoid fever is certainly communicated through a tainted water supply exposed to the taint of infected vaults. Poisoned springs have been traced to this infection, and in a celebrated English dairy case, where poisoned milk was claimed to have been sold, scientific examination disclosed the fact that the milk had been contaminated through the cows having lain upon ground manured from infected vaults. Another source is in the ice supply, often taken from shallow ponds in the neighborhood of large cities, freezing not destroying the germ as supposed. The air in localities becomes contaminated from sewage deposits; and Budd states, as early as 1859, that the germ of this disease never originates *de novo*, but proceeds from a special and specific poison, capable of great diffusion and preserving its noxious qualities for a long period, even if buried for many months. In England the preventability of typhoid fever is so thoroughly established that an innkeeper who has a guest ill with it, is held criminally responsible if any other case could be traced to the one under his roof. By this means infectious subtances are destroyed and the spread of the disease prevented. Boiling water applied to the discharges is said to destroy the infection. But when the subtstance is allowed to escape as sewage it must be disinfected by prompt means.

Diphtheria is much more prevalent and much worse in localities supplied with bad water. The microscope can detect a few of the germs of epidemic diseases either in the water or in the system, and the only sure method is to watch the slightest approaches of disease and investigate the sources of our water supply, whether in city or country. Chlorine gas, from recent experiments, seems to be a disinfectant as well as a deodorizer. This greenish-colored gas effectually seizes upon and destroys any hidden germs existing in dwellings, ships, etc. This gas has been used successfully at Bellevue hospital and other places. We must purify and quarantine. Mediums of communication have been made available to epidemics as well as to mankind in his business affairs.

The Fluids of the Body.—Prof. Jager, of Leipsic, has recently published a work in which he maintains that an increased proportion of water in the tissues and humors of the body is one of the most essential conditions of liability to disease. To guard against disease, therefore, it is necessary to make the body yield as much water as possible through skin and lungs, and to avoid all that favors the accumulation of water. To this end he recommends the wearing of close-fitting woolen clothing throughout the year; all bodily movements which promote perspiration; on outbreak of disease the use of vapor or sweating baths, of drinks that excite perspiration, and of foods that do the same; constant ventilation of sitting and bed rooms, so that the moisture of the air may not become great. Dr Jager asserts that the specific gravity of a living body is an accurate criterion of the strength of constitution of a man or a domestic animal—that is to say, for its capability of resistance to causes of diseases, such as chills, infection, etc., and its power of work, bodily and mental.

Wind Gauge.—A simple apparatus for continuously recording the direction of the wind, constructed by M. Redier, is now in use at the observatory at Lyons. A weathercock of suitable form is supported by a sort of tripod of grooved wheels running upon a circular rail of steel (the wheels having individually a horizontal axis, but collectively a vertical). From the weathercock passes down a vertical rod to connection with a cylinder (placed with axis vertical), which is supported below by a steel pivot resting on a plate of agate, and is guided at the upper part by horizontal pulleys. Thus each movement of the weathercock is transmitted to the cylinder. The latter has wound round it a sheet of paper, graduated vertically and horizontally (the vertical divisions representing the hours, the horizontal the directions), and a pencil applied to the paper is moved in vertical directions by clock-work. It will thus be seen that the tracing obtained on the paper indicates the successive positions taken by the weathercock, and, accordingly, the direction of the wind for any given time.

Lightning Rods.—Mr. R. S. Brough has been discussing, in the *Philosophical Magazine*, the proper sectional areas of iron and copper lightning rods. So far as mere conductivity is concerned, a comparatively thin wire of either metal would suffice for any conductor; but such a thin conductor would be dangerous, because it would be fused by a heavy discharge of lightning. Iron being more liable to be fused than copper, Mr. Brough sought to determine the relative sectional areas of rods of two metals, so that neither would be more liable to fuse than the other. Ordinarily, it is stated that the iron rod should have four times the sectional area of the copper rod. Mr. Brough shows that these areas should be as eight to three; or since the rods are invariably made circular, and circular areas are to each other as the square of their diameters, the diameters of iron and copper rods of equal effectiveness should be in the proportion of 1.63 to 1. Iron is, therefore, much the cheaper metal for lightning rods.

Indelible Ink.—The *Apotheker Zeitung* gives the following formula: 1.75 grammes aniline black are ground up with 60 drops hydrochloric acid and 42 grammes alcohol, and the liquid is diluted with a hot solution of 2.5 grammes gum arabic in 170 grammes water. If the aniline black solution is diluted with a solution of 2.5 grammes shellac in 170 grammes spirit instead of gum water, the result is an ink suitable for writing on wood, brass or leather.

The Telephone as a Lightning Indicator.—Mr. George M. Hopkins, of Brooklyn, N. Y., during a recent thunder storm connected the gas and water pipe of his dwelling with an ordinary Bell telephone, and discovered that the electrical discharges were plainly indicated, either by a sharp crack or by a succession of taps. This occurred when the discharge was so distant that the thunder was inaudible. The sound also seemed to be perceived by the ear before the lightning could be seen. There was a marked difference in the character of the discharges, some that appeared single to the eye were really multiple. Often the discharges would consist of a series, beginning and ending with discharges larger than the rest, thus: — · · · · · —, sometimes it would be thus: — · · · · · —, sometimes the reverse, and often a single crack. The gas and water pipes were used, being the most convenient and at the same time the safest conductors for the purpose. Special apparatus might be devised, having a good ground, and a series of points for gathering the electricity from the air, but in using apparatus of this kind there is always more or less danger.—*Scientific American.*

Electric Inscription of Words.—The transmitting apparatus is a microphonic speaker, the carbons of which instead of being pressed by a spring, are simply maintained in contact by the pressure of a small piece of paper folded in the form of a V. The vibrations of the diaphragm of the receiving apparatus cannot be written, since the movements of the style, however delicate the apparatus, can scarcely be distinguished upon the lamp-black. To enlarge the magnetic vibrations of the receiver the cover and the diaphragm of a Bell's telephone are taken away, and on the wood of the instrument there is fixed the end of a small, stiff steel spring. The other end of the spring abuts on the surface of the magnetic nucleus surrounded by its coil; to this extremity is soldered a small mass of soft iron, weighing about 10 grms., and upon this mass and in the produced line of the axis of the spring is fixed a light style of bamboo, 10 centimeters in length and terminating in a slender whale-bone pen.—*M. Boudet.*

Communications with Lighthouses.—A new description of rocket, called the "buoyant rocket," has been produced by the Royal Laboratory Department, at the request of the Board of Trade. A rocket was required as a means of communication between the shore and lighthouses a few hundred yards from the main land during bad weather, and in circumstances under which the ordinary life-saving rock apparatus by which a line is conveyed to a wrecked vessel would be unavailable. The Laboratory have answered the demand by adopting the old-fashioned Congreve rocket to meet the required end. A small iron tube containing the composition is enclosed in a casing of cork, and fitted to a stick in primitive fashion, with a line made fast to the extremity, and the simple arrangement has admirably succeeded. Three of the rockets have been tried at Shoeburyness, being fired from a trough at the surface of the sea, and plowing a direct course through the water with a strong line attached, by means of which an assistant or a boatload of provisions could be conveyed to the lighthouse keeper.

Improvement in Sugar Manufacture.—A sugar planter and manufacturer sends the Martinique *Bienpublic* an account of an experimental application to sugar cane of the diffusion process employed in the best-sugar factories of France and Germany. The experiments were made at the plantation Monrepos, Guadaloupe, with an apparatus of six macerators. It was badly adapted to meet the difficulties incident to the peculiar nature of cane, yet it showed (1) that by a methodical washing of the slices of cane an artificial juice nearly equal in density to natural cane juice could be obtained; and (2) that one hour of systematical maceration is sufficient to completely exhaust the cane fiber of the sugar which it contains.